WHO IS RESPONSIBLE FOR THE NASA RELIABILITY &MAINTAINABILITY PROGRAM?

- **Program/Project Managers**
  - Ensure the integration of R&M processes, analytical activities, and data with systems engineering, risk management, and other processes, assessments, and analyses. These include, but are not limited to, safety, security, quality, logistics, availability, probabilistic risk assessment, life-cycle cost, configuration management, and maintenance.

PROGRAM/PROJECT CONSIDERATIONS FOR RELIABILITY & MAINTAINABILITY

Environmental Stress Screening
Reliability Centered Maintenance
Reliability Requirements
Redundancy
Parts Selection Criteria and Control
Use of Preferred Parts and Materials
De-rating of Parts
Reliability Plan
Components Service
Conformal Coating
Simplicity of Design
Predictions
Control of the Physical Environment
Expected Operating and Storage Times
Failure Propagation
Probabilistic Structural Analysis
Failure/fault tolerance
Burn-in to Eliminate Infant Mortality
Product Survival in the Intended Mission-Environment

☑ YOUR PREPAREDNESS FOR AN AUDIT OF NASA RELIABILITY & MAINTAINABILITY PROGRAM REQUIREMENTS WITH THESE SAMPLE AUDIT GUIDE QUESTIONS.

MANAGEMENT:

1. Where have you documented the Reliability & Maintainability requirements for your program?
2. Where do you track the status of achieving your program's R&M requirements? Show examples?
3. How is configuration management of your program's Reliability & Maintainability requirements achieved?
4. Does your program share Reliability & Maintainability data with other programs? What data sources do you access?
5. What failure analysis tools are you using within your program?
6. What reliability modeling tools do you use?
7. How is your program maintaining configuration management on failure analysis? Who tracks the status?

GENERAL:

1. Where would you find your Reliability & Maintainability Program requirements?

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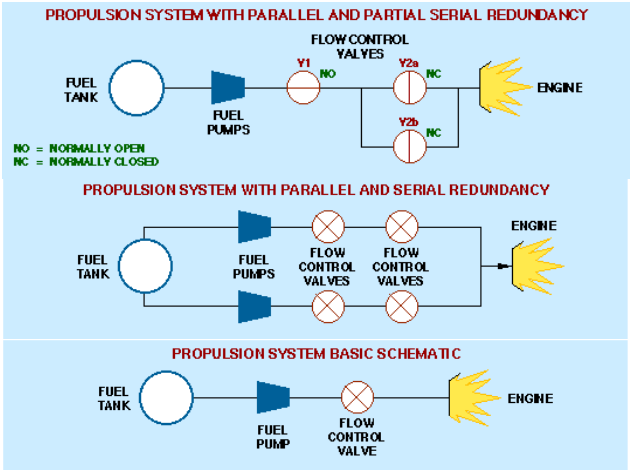
SAFETY AND MISSION ASSURANCE
REQUIREMENTS

NPD 8720.1

NASA Reliability & Maintainability Program

Compliance Verification Guide



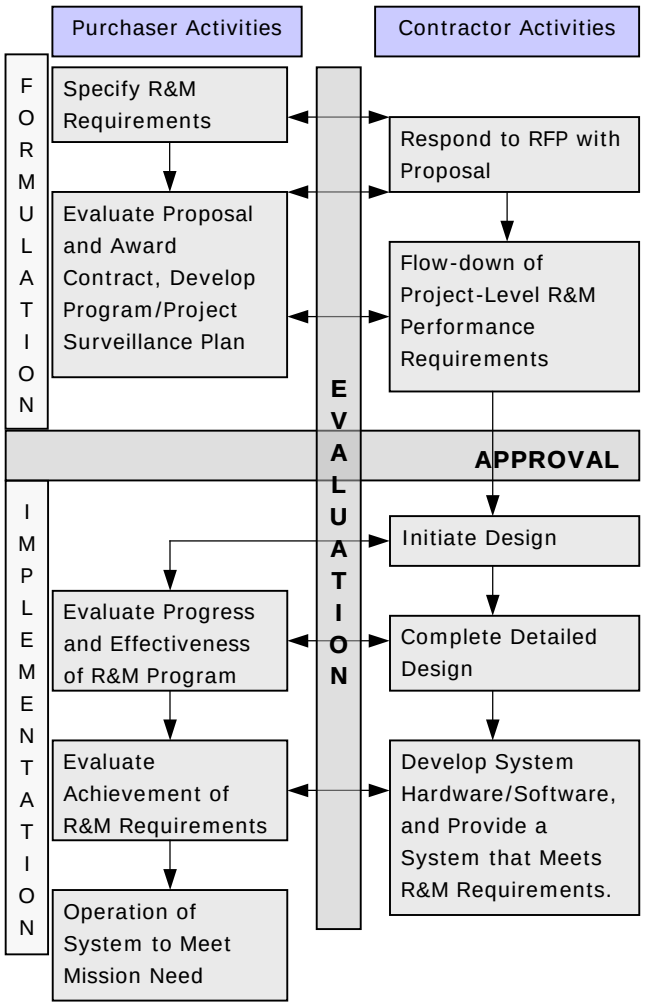
OFFICE OF SAFETY AND MISSION ASSURANCE

This brochure is intended to be used as a guide only, not as a replacement for the actual policy. To review the Reliability & Maintainability (R&M) Procedural Requirement (NPD 8720.1) in its entirety, see http://www.hq.nasa.gov/office/codeq/doctree/texttree.htm.

Why do we have a Reliability & Maintainability Program?

To design systems that reduce the likelihood of component and system failures or in the event of failure, increase the likelihood of restoring the system to full capability.

Reliability & Maintainability Program with the Acquisition Subprocess



MINIMUM AUDIT POINTS FOR NPD 8720.1

PROCESS

- **Program / Project Managers**
  - Plan and document requirements and tasks for Reliability & Maintainability engineering, analysis, and testing (including hardware, software, firmware, and human elements).
    - Objective Quality Evidence (OQE) – Reliability & Maintainability and Program Plans and Requirements
  - Plan and document system Reliability & Maintainability design and operational performance requirements (qualitative and quantitative).
    - OQE – Documented Reliability & Maintainability Design and Operational Performance Requirements
  - Integrate all Reliability & Maintainability activities with the associated design and operation functions and associated program/project safety, quality assurance, risk management (including probabilistic risk assessment), and logistics activities.
    - OQE – Reliability & Maintainability and Program Plans
  - Establish and document a system maintenance concept early in the system development and ensure that compatibility is sustained among system design, maintenance planning, and logistics support activities.
    - OQE – Documented System Maintenance Concept, Documented Reliability & Maintainability Tasks in Statements of Work
  - Establish and maintain logistics support capability to sustain delivered hardware and software systems, consistent with the intended mission requirements and plans.
    - OQE – Logistics Support Plans
  - Coordinate with the Center Safety and Mission Assurance (SMA) functional manager to ensure that Reliability & Maintainability data is available for use as heritage data.
    - OQE – Reliability & Maintainability Information Sharing Knowledge Base
  - Identify the organization(s) that will maintain the Reliability & Maintainability data for the lifetime of the system and coordinate with the Center SMA functional manager to ensure that Reliability & Maintainability data is available for use as heritage data.
    - OQE – Reliability & Maintainability Information Sharing Knowledge Base

REVIEWS AND CHECKS

- **Program / Project Managers** continually assess the progress toward achieving the Reliability & Maintainability requirements, including identification of areas for improvement.
  - OQE – Documented Reliability & Maintainability Assessments

Generic R&M Process

Identify Desired Outcomes by defining system operating environment and program mission requirements & objectives.

Select Measures and Indicators by establishing quantifiable and programmatic R&M performance measures and indicators.

Set Performance and Surveillance Standards by establishing R&M performance standards, defining and implementing requirements and developing Program Surveillance plans & risk management Plans.

Report Results by comparing predicted and demonstrated R&M vs. requirements, access progress toward achieving R&M requirements, and evaluate system availability, reliability and maintenance demand over system life.

Use Results for Planning, Managing and Budgeting by supporting related program analysis such as safety and logistics emphasize R&M improvements to succeeding systems.